**YEAR 11 BIOLOGY UNIT 1**

**PAST PAPER Q**

**GASEOUS EXCHANGE SOLUTIONS**

MULTIPLE CHOICE

TSSM 2011

Question 11

Answer: C

Explanation:

I is incorrect; a mosaic pattern does not increase exposure to sunlight. Some plants have variegated leaves and have areas with no green pigmentation where photosynthesis cannot occur.

II is incorrect; the thickness of the leaves does not affect the rate of diffusion although increasing the number of stomata on the surface of the leaf would have this effect.

III is correct; water is a reactant in the process of photosynthesis

IV is correct; chloroplasts are the site of photosynthesis, having large numbers of chloroplasts allows the plant to photosynthesise more efficiently.

Question 12

Answer: B

Explanation:

Plants lose water by the process of transpiration; the rate of water loss increases when

temperature increases. Stomata close to limit water loss, this prevents gas exchange causing the rate of photosynthesis to decrease due to a lack of carbon dioxide.

SHORT ANSWER

Question 5

a. Diaphragm

1 mark

b. Expiration

1 mark

AND

As the diaphragm moves up the volume of the thoracic cavity decreases, the pressure in

the lungs is higher than outside the body and air moves out of the body to equalise

internal and external pressure.

1 mark

c. Gas would be flowing in the situation shown in diagram 1 because air is being forced out of the lungs due to a change in internal pressure.

1 mark

AND

Gas would not be flowing in the situation shown in diagram 2 because the downward

movement of the diaphragm has stopped and the pressure in the alveoli is equal to

atmospheric pressure. 1 mark

d. Any 2 of the following:

· Thin

· Moist

· High surface area to volume ratio

· Any other reasonable suggestion

1 mark for each correct answer

INSIGHT 2011

6b. i. What is the name given to the cells that surround a stoma?

1 mark

Solution

Guard cells

6b. ii. Explain the benefit, to a plant, of stomata that open during the day and close at night.

2 marks

Solution

If stomata are open during the day, CO2 can enter the airspaces and cells and become available for photosynthesis. If stomata are closed at night, loss of water is prevented.

Mark allocation

• 1 mark – benefit of opening during the day

• 1 mark – benefit of closing at night

TSSM 2011

Question 2

a. Structure A is an alveolus.

1 mark

AND

Structure B is a capillary

1 mark

b. Diffusion

1 mark

c. Any 2 of the following:

• The surface is thin

• The surface is moist

• The surface has a high surface area to volume ratio

• The surface is highly vascular

• Any other reasonable answer

1 mark

d. The thin surface of the alveoli means that gases only have a very short distance to diffuse across so diffusion occurs rapidly.

OR

In mammals the respiratory gases must be dissolved, the moist surface of the alveoli

dissolves the respiratory gases.

OR

Increasing the surface area to volume ratio enables gas exchange to occur more

efficiently.

OR

Oxygen needs to be transported to the body tissues, the alveoli is surrounded by

capillaries to facilitate oxygen being taken up by red blood cells.

OR

Any other reasonable answer

1 mark for any correct answer to a maximum of 1 mark

e. The concentration of oxygen gas decreases in the exhaled air compared to the inhaled air as it is used as a reactant for cellular respiration.

1 mark

AND

The concentration of carbon dioxide increases in the exhaled air as it is a product of

cellular respiration.

1 mark

f. Since carbon monoxide preferentially binds to haemoglobin, less oxygen is able to bind to haemoglobin.

1 mark

AND

This means that less oxygen reaches the tissues and the rate of cellular respiration will

decrease in those tissues as oxygen is a reactant for cellular respiration.

1 mark